DENON

SERVICE MANUAL
MODEL HA-500

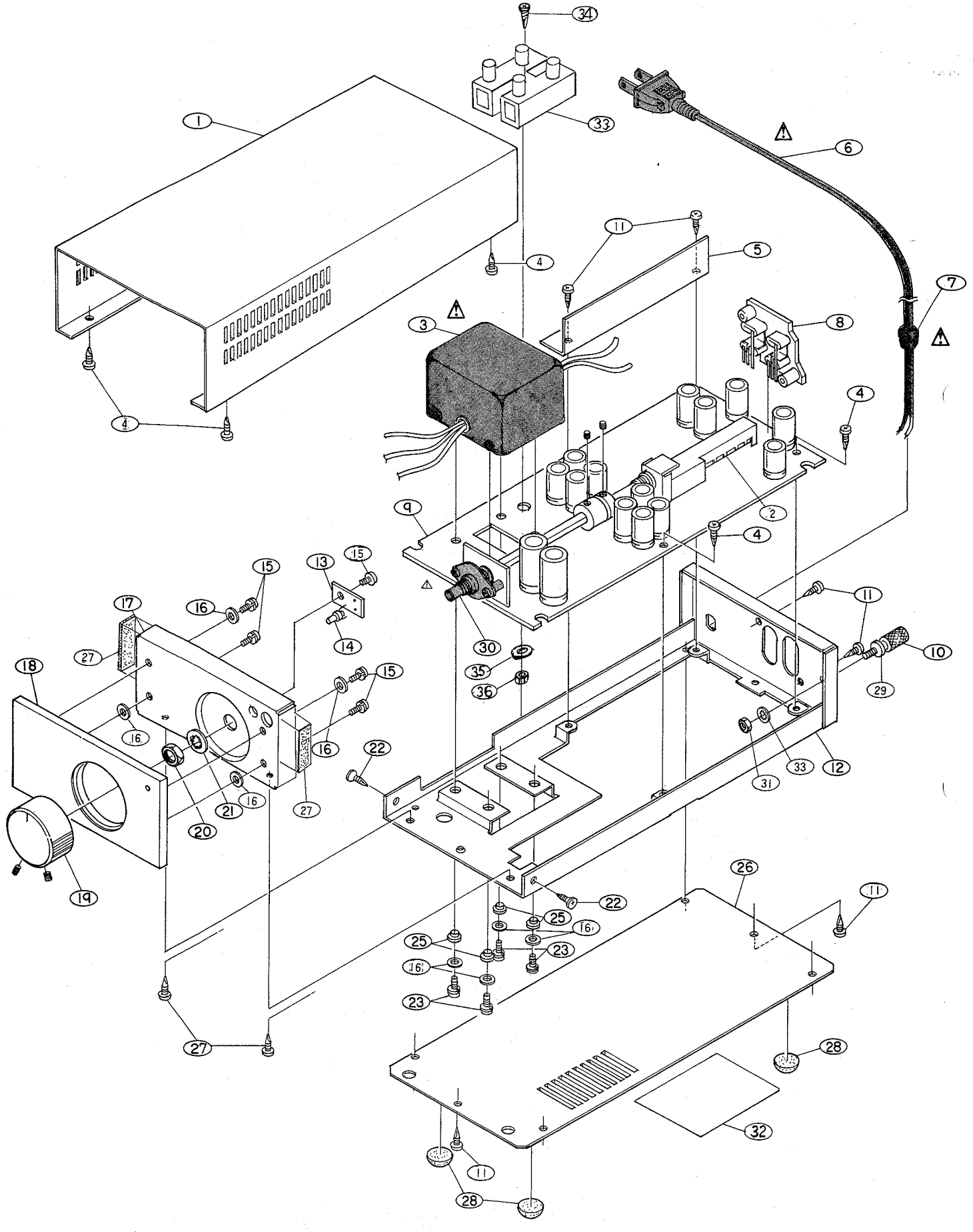
MOVING COIL CARTRIDGE
HEAD AMPLIFIER

SPECIFICATIONS

Input Impedance:	100 ohm
Voltage Gain:	32 dB/24 dB/0 dB(MM), (three stages)
Maximum Output Level:	2.5 Vrms
Noise Voltage Reffered Input:	-157 dB/V (input terminals shorted IHF "A")
Frequency Response:	10 Hz to 600 kHz $^{+0}_{-1}$ dB
Total Harmonic Distortion: (20 Hz to 20 kHz)	less than 0.008 % (at 0.3 Vrms output)
Intermodulation Distortion: (60 Hz: 7 kHz = 4:1)	less than 0.008 % (at 0.3 Vrms output)
Crosstalk (1 kHz);	less than -70 dB
Power Source:	AC 120 volt, 60 Hz (for U.S.A. and Canada) AC 220 volt, 50 Hz (for Europe, Singapore and Hongkong) AC 240 volt, 50 Hz (for U.K.)
Power Consumption:	10 W
Dimensions:	126(W) x 71(H) x 305(D) mm
Weight:	2.2 kg

NIPPON COLUMBIA CO., LTD.

EXPLODED VIEW



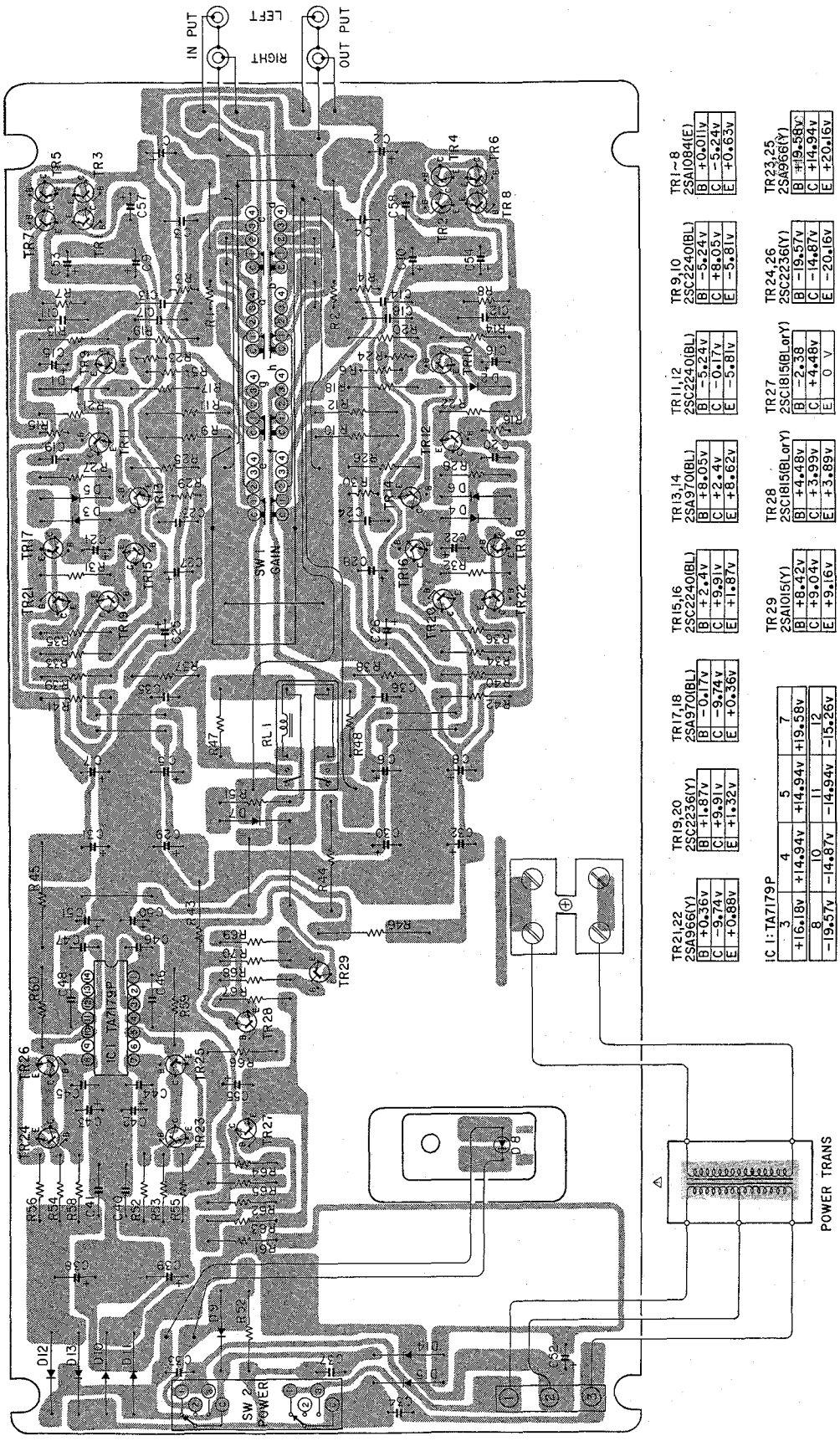
CHASSIS AND CABINET GROUP PARTS LIST

Ref.No.	Part No.			Description
1	102	0081	105	
2	212	0139	008	ROTARY SWITCH (GAIN)
4	473	0354	035	3 x 8 CBRTS
5	414	0157	107	SHIELD BRACKET
7	445	0020	005	CORD BUSH
8	204	8050	007	4P CONNECTOR BASE
10	205	0043	109	GROUND TERMINAL
11	477	0064	107	FIXING SCREW
12	411	0197	003	MAIN CHASSIS
13				LED BOARD
14	393	9012	027	LED SEL-103R
15	471	0812	005	3 x 5 CPS (SW)
16	475	1003	019	3 W
17	411	0188	106	FRONT CHASSIS
18	144	0418	109	FRONT PANEL
19	112	0222	107	KNOB
20				9 N
21				9 TWA
22	473	2354	033	3 x 8 CFTS
23	470	0042	047	3 x 12 CPS (SW)
24	475	3100	004	4 TWA
25	415	0137	007	INSULATING WASHER
26	105	0245	209	BOTTOM PLATE
27	461	0061	150	RUBBER SHEET
28	104	0036	004	FOOT
29	477	0088	002	4.1 W
30	212	0138	009	ROTARY SWITCH
31	477	0006	000	4 N

Ref. No.	Parts No.	Parts No.				
		For Europe	For U.S.A.	For Hongkong	For U.K.	
3	POWER TRANSFORMER	2335153002	2335154001	2335162006		
6	POWER CORD	2062002002	2062019008	2062002002	2062020000	
7	CORD BUSHING	4450020005	MD-3802	4450020005	MD-2982H	
9	MC AMP. UNIT	ETC-309B	ETC-309	ETC-309B	ETC-309B	
32	RATING SHEET	5130403006	-	5130403006	5130403006	
33	2P TERMINAL BLOCK	2050086001	NONE	2050086001	2050086001	
34	SCREW 3x16cps	4711309012	NONE	4711309012	4711309012	
35	WASHER 3mm	4751003006	NONE	4751003006	4751003006	
36	NUT 3mm	4756006008	NONE	4756006008	4756006008	
32	SERIAL NO. PLATE	-	5130398014	-	-	

PRINTED CIRCUIT BOARD PATTERNS AND PARTS LIST

MC AMPLIFIER UNIT ETC-309



Ref. No.	Part No.			Description	
	222	0479	105	PRINTED CIRCUIT BOARD	
SW1	212	0139	008	ROTARY SWITCH (GAIN)	
SW2	212	0138	009	ROTARY SWITCH	
RL1	214	0035	001	RELAY	
SEMICONDUCTORS					
TR1-8	271	0106	001	2SA1084(E)	TRANSISTOR
TR9-12,15,16	273	0187	013	2SC2240(BL)	"
TR13,14,17,18	271	0094	016	2SA970(BL)	"
TR19,20,24,26	273	0201	009	2SC2236(Y)	"
TR21-23,25	271	0105	002	2SA966(Y)	"
TR27,28	273	0198	015	2SC1815(BL)	"
TR29	271	0102	005	2SA1015(Y)	"
IC1	263	0086	007	TA7179P	I.C.
DIODE					
D1,2,7,14,15	276	0049	011	1S2076A	DIODE
D3-6	276	0200	009	MV-11	"
D8	393	9012	027	LED (SEL-103R)	
D9	276	0124	008	RW06	DIODE
D10-13	276	0191	008	W03C	"

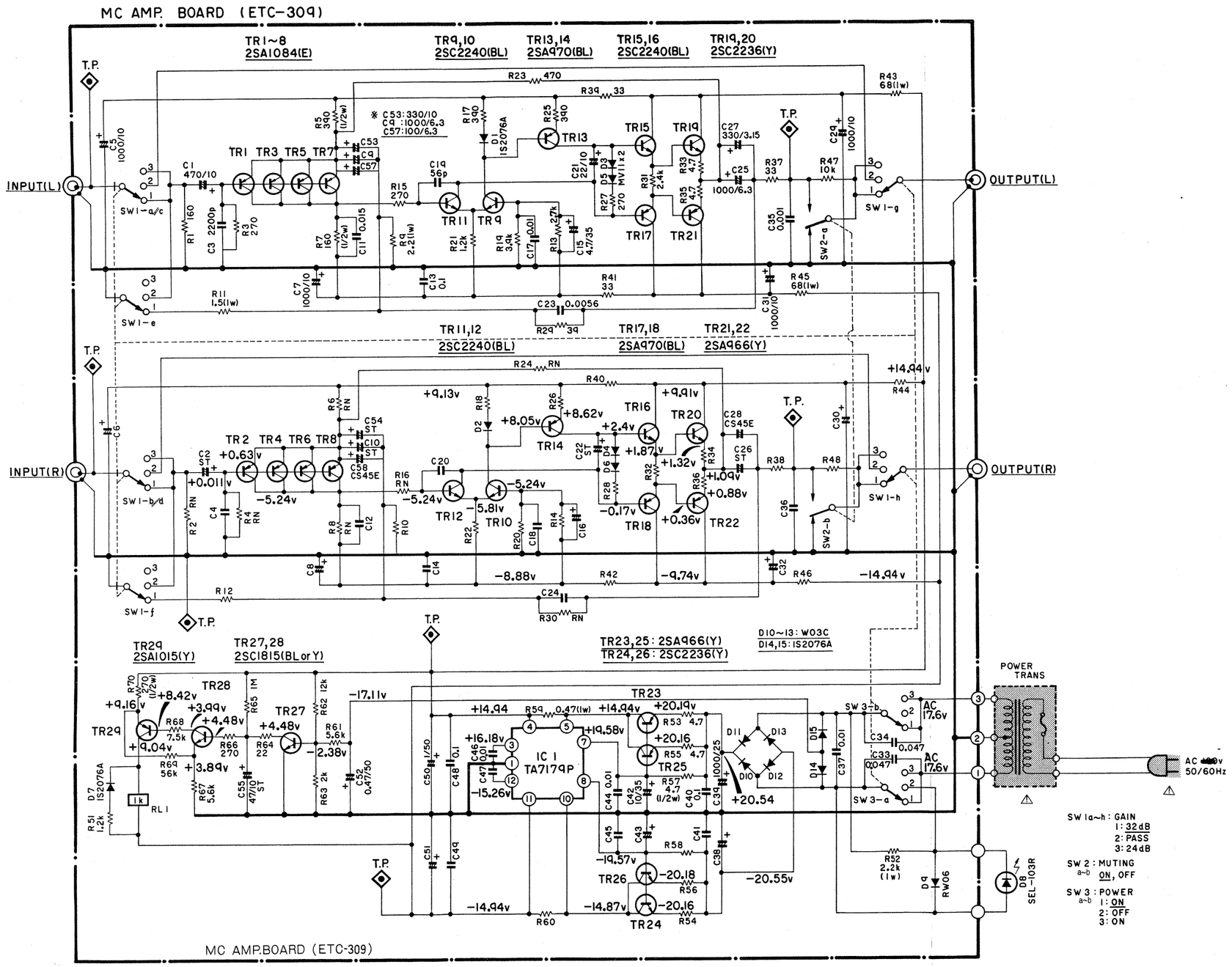
RESISTORS

Ref. No.	Part No.	Description
R 1,2	2452012013	160 ohm 1/4 W METAL FILM RESISTOR
R 3,4,15,16	2452012026	270 ohm 1/4 W METAL FILM RESISTOR
R 5,6	2452014011	390 ohm 1/4 W METAL FILM RESISTOR
R 7,8	2462003009	160 ohm 1/4 W METAL COMPOSITION RESISTOR
R 9,10	2440009009	2.2 ohm 1 W METAL OXIDE FILM RESISTOR
R 11,12	2440007001	1.5 ohm 1 W METAL OXIDE FILM RESISTOR
R 13,14	2410324002	2.7 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 17,18,25,26	2410304006	390 ohm ±5% 1/4 W CARBON FILM RESISTOR
R 19,20	2410328008	3.9 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 21,22,51	2410316007	1.2 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 23,24	2452012055	470 ohm 1/4 W METAL FILM RESISTOR
R 27,28,66	2410300000	270 ohm ±5% 1/4 W CARBON FILM RESISTOR
R 29,30	2452012000	39 ohm 1/4 W METAL FILM RESISTOR
R 31,32	2410323003	2.4 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 33,34,35,36	2410258000	4.7 ohm ±5% 1/4 W CARBON FILM RESISTOR
R 37,38,39 40,41,42	2410278006	33 ohm ±5% 1/4 W CARBON FILM RESISTOR
R 43,44,45,46	2440027010	68 ohm ±5% 1 W METAL OXIDE FILM RESISTOR
R 47,48	2410338001	10 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 52	2440045018	2.2 ohm ±5% 1 W METAL OXIDE FILM RESISTOR
R 53,54,55,56	2410258000	4.7 ohm ±5% 1/4 W CARBON FILM RESISTOR
R 57,58	2410153008	47 ohm ±5% 1/2 W CARBON FILM RESISTOR
R 59,60	2442011008	0.47 ohm ±5% 1/2 W METAL OXIDE FILM RESISTOR
R 61,67	2410332007	5.6 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 62	2410340002	12 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 63	2410321005	2 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 68	2410335004	7.5 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 64	2420274000	22 ohm ±5% 1/4 W CARBON FILM RESISTOR
R 65	2410765001	1.0 Mohm ±5% 1/4 W CARBON FILM RESISTOR
R 69	2410356009	56 kohm ±5% 1/4 W CARBON FILM RESISTOR
R 70	2410171006	270 ohm ±5% 1/4 W CARBON FILM RESISTOR

CAPACITORS

Ref.No.	Part No.			Description	
C 1,2	254	9015	046	470 μF	10V ELECTROLYTIC CAPACITOR
C 3,4	255	4077	082	2200PF	100V PLASTIC FILM CAPACITOR
C 5-8,29-32	254	4014	000	1000 μF	10V ELECTROLYTIC CAPACITOR
C 9,10,25,26	254	9016	003	1000 μF	6.3V ELECTROLYTIC CAPACITOR
C 11,12	255	4079	080	0.015 μF	100V PLASTIC FILM CAPACITOR
C 13,14	253	1027	000	0.1 μF	50V CERAMIC CAPACITOR
C 15,16	254	9011	037	4.7 μF	50V ELECTROLYTIC CAPACITOR
C 17,18	255	4079	048	0.01 μF	100V PLASTIC FILM CAPACITOR
C 19,20	253	3621	006	56PF ±5%	50V CERAMIC CAPACITOR
C 21,22	254	9015	004	22 μF ±10%	10V ELECTROLYTIC CAPACITOR
C 23,24	255	4078	081	0.0056 μF ±5%	100V PLASTIC FILM CAPACITOR
C 27,28	254	1045	014	330PF ±5%	3.15V TANTALUM SOLID CAPACITOR
C 33,34	253	1026	001	0.047 μF	50V CERAMIC CAPACITOR
C 35,36	255	4077	008	1000PF ±5%	100V PLASTIC FILM CAPACITOR
C 37	253	1024	003	0.01 μF	50V CERAMIC CAPACITOR
C 38,39	254	4032	008	1000 μF	25V ELECTROLYTIC CAPACITOR
C 42,43	254	4035	005	10 μF	35V ELECTROLYTIC CAPACITOR
C 44-49	253	1024	003	0.01 μF	50V CERAMIC CAPACITOR
C 50,51	254	4044	009	1 μF	50V ELECTROLYTIC CAPACITOR
C 52	254	4043	000	0.47 μF	50V ELECTROLYTIC CAPACITOR
C 53,54	254	9015	033	330 μF ±10%	10V ELECTROLYTIC CAPACITOR
C 55	254	9015	017	47 μF ±10%	10V ELECTROLYTIC CAPACITOR
C 57,58	254	1046	013	100PF ±10%	6.3V TANTALUM SOLID CAPACITOR

WIRING DIAGRAM

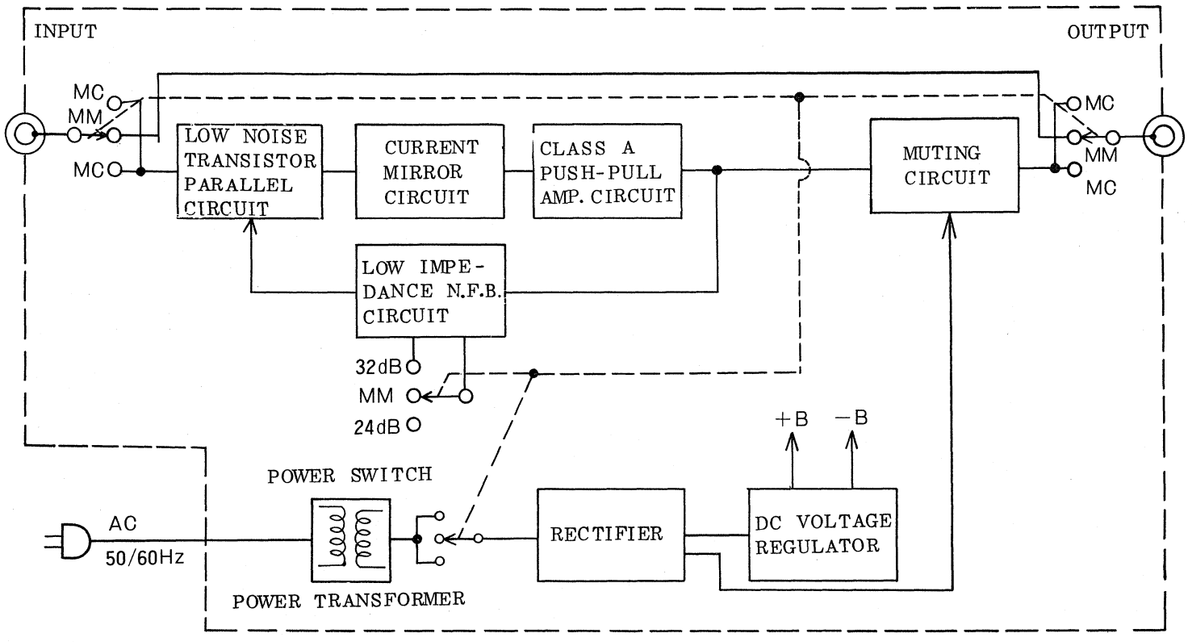


TR1~8: 2SA1084(E) TR9,10: 2SC2240(BL) TR11,12,15,16: 2SC2240(BL)
TR13,14,17,18: 2SA970(BL) TR13,14,17,18: 2SA970(BL) TR19,20: 2SC2236(Y)
TR21,22: 2SA966(Y) TR23,25: 2SA966(Y) TR24,26: 2SC2236(Y)
TR27,28: 2SC1815(BL)/(Y) TR29: 2SA1015(Y)

NOTES

ALL RESISTANCE VALUES IN OHM K = 1,000 OHM M = 1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD P = MICRO-MICRO FARAD
EVERY VOLTAGES AND CURRENTS IS MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

BLOCK DIAGRAM



DENON

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